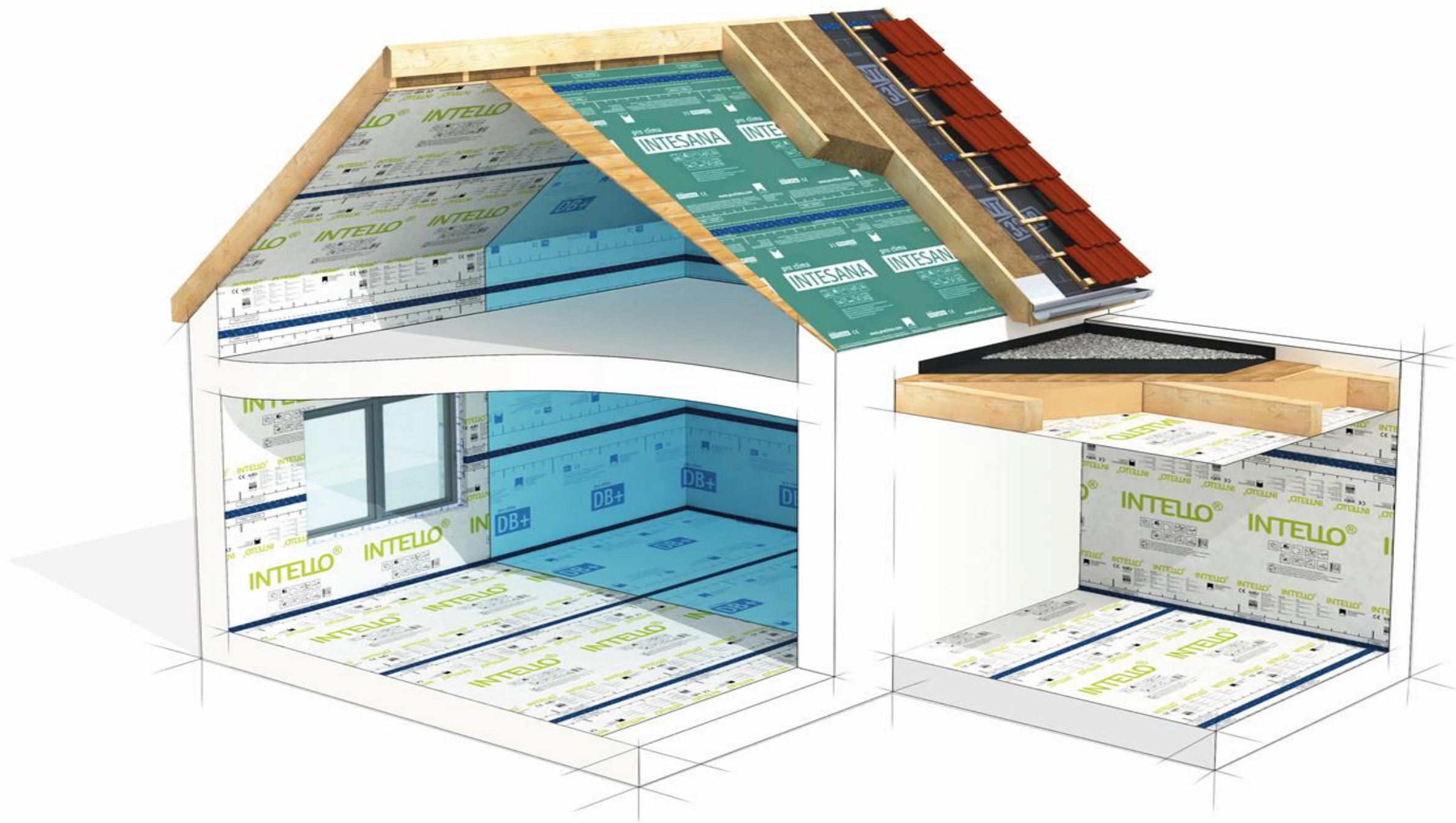




**...and the insulation  
is perfect**



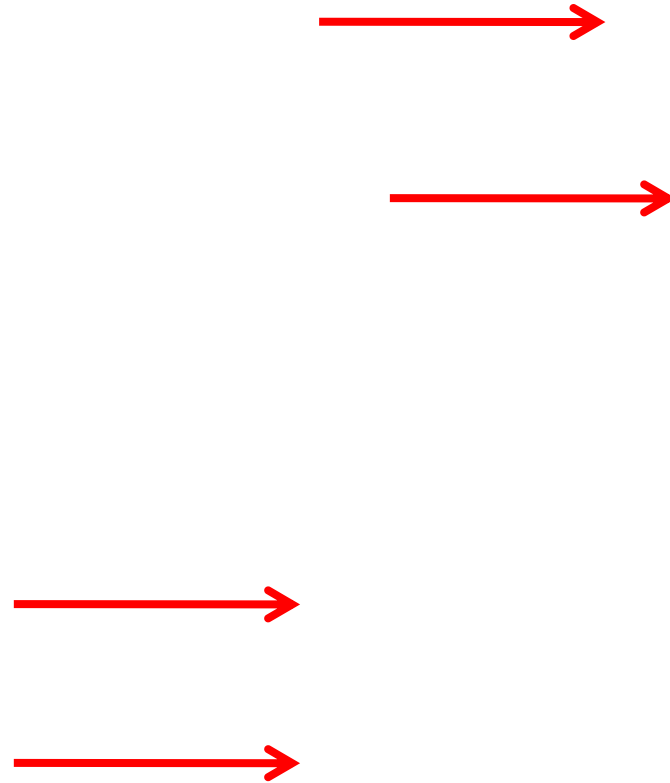




... und die Dämmung ist perfekt



# The principle of insulation



**insulation**

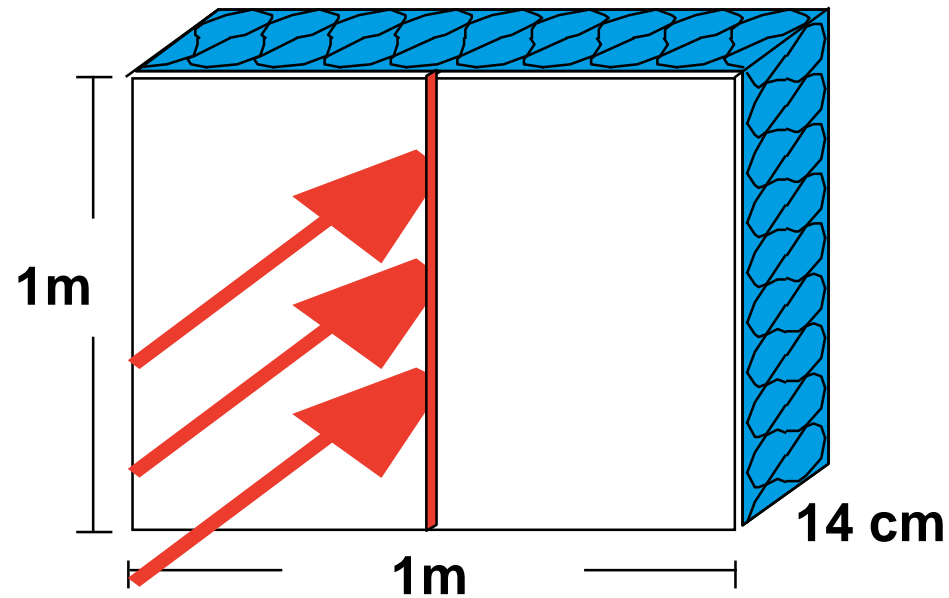
**=air in small chambers/inclusion of pores**

**air movement**

**=heat transport**

Only inclusions of air that are protected against air movement insulate!

# Heat losses – due to air movements



Without gap: U-Value = 0,3 W/m<sup>2</sup>K

With 1 mm gap: U-Value = 1,44 W/m<sup>2</sup>K

Performance down by factor 4,8

## Experiment set-up

### Construction of insulating material

Gap in the vapour seal  
(air-tightening).

Frame conditions:

Inside temperature +20° C

Outside temperature -10° C

Pressure difference 20 Pa

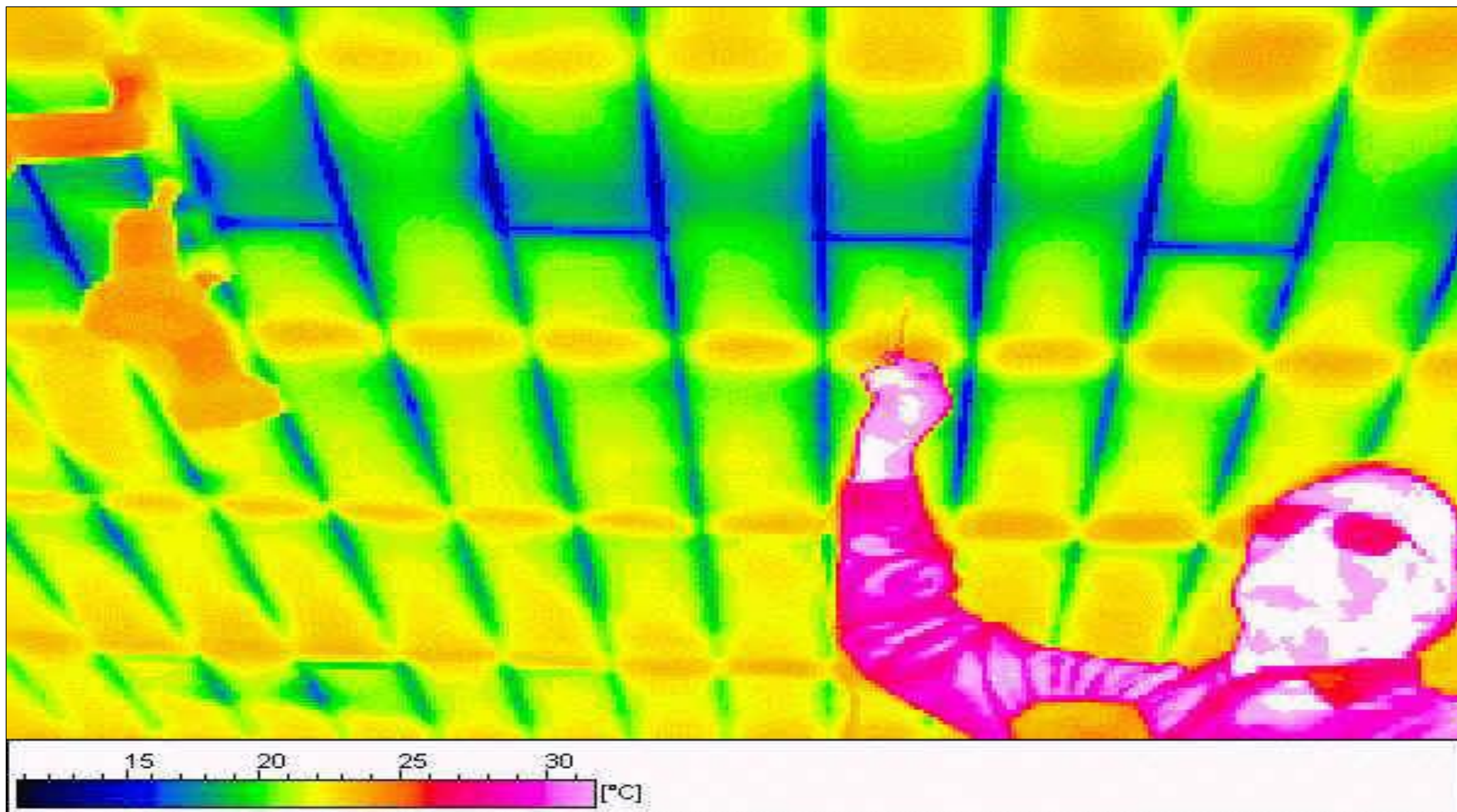
= wind force 2-3

Measurement:

Institute of building physics, Stuttgart

Source: DBZ 12/89, page 1639ff





# Structural damage due to moisture

Winter - condensation on the outside of the construction

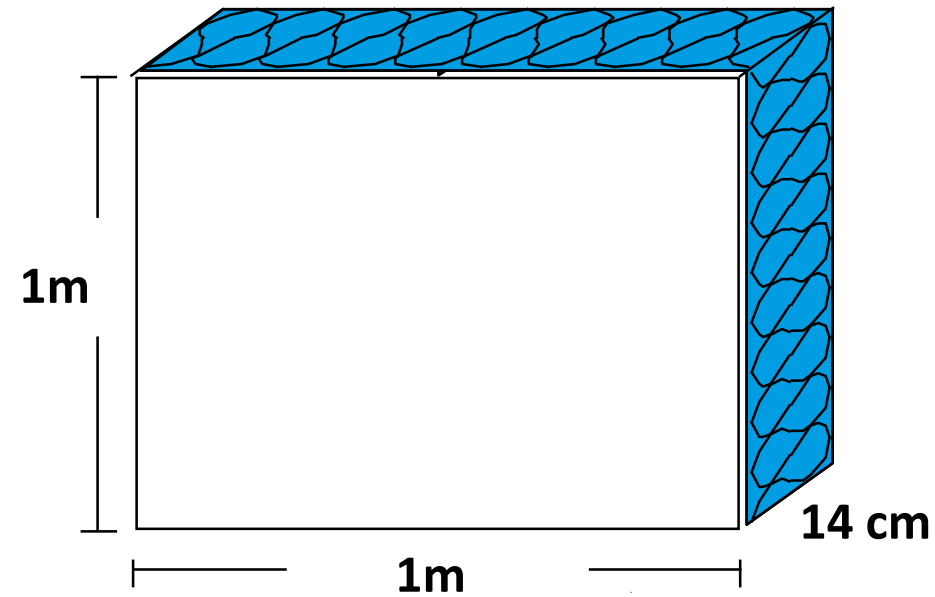


Summer - condensation on the inside of the construction



# Possibilities for moisture load to the construction

## 1.) Diffusion

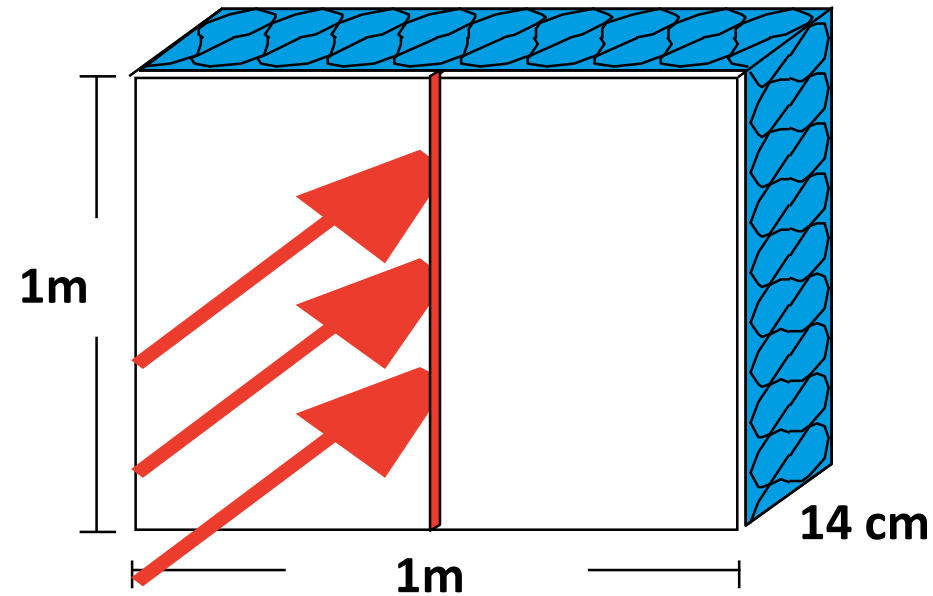


Without gap: 0,5 g water/m<sup>2</sup>x24h



# Possibilities for moisture load to the construction

## 2.) Convection

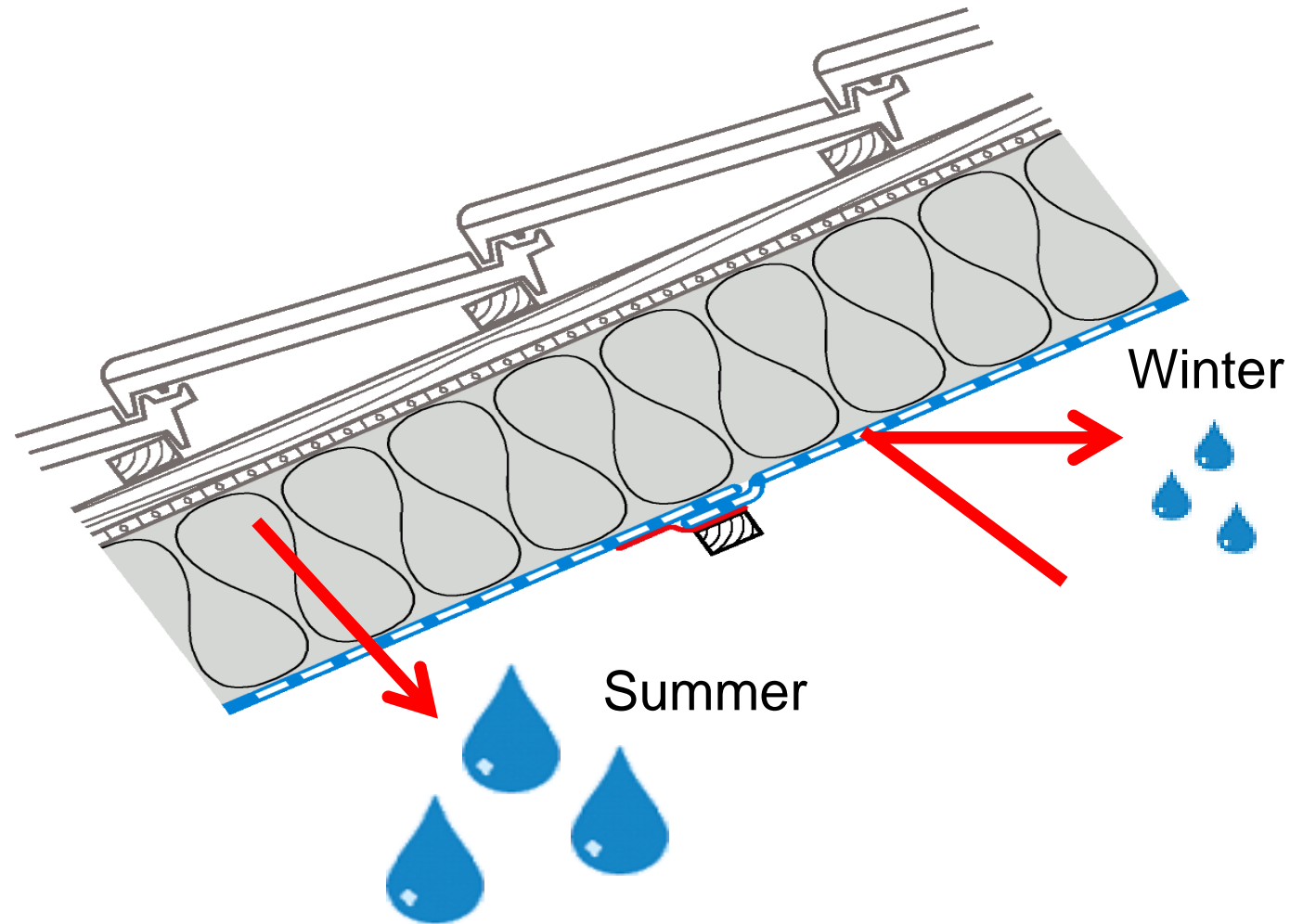


Without gap: 0,5 g water/m<sup>2</sup>x24h

With 1 mm gap: 800 g water/m<sup>2</sup>x24h

Performance down by factor 1600

# Membranes with humidity – variable diffusion resistance

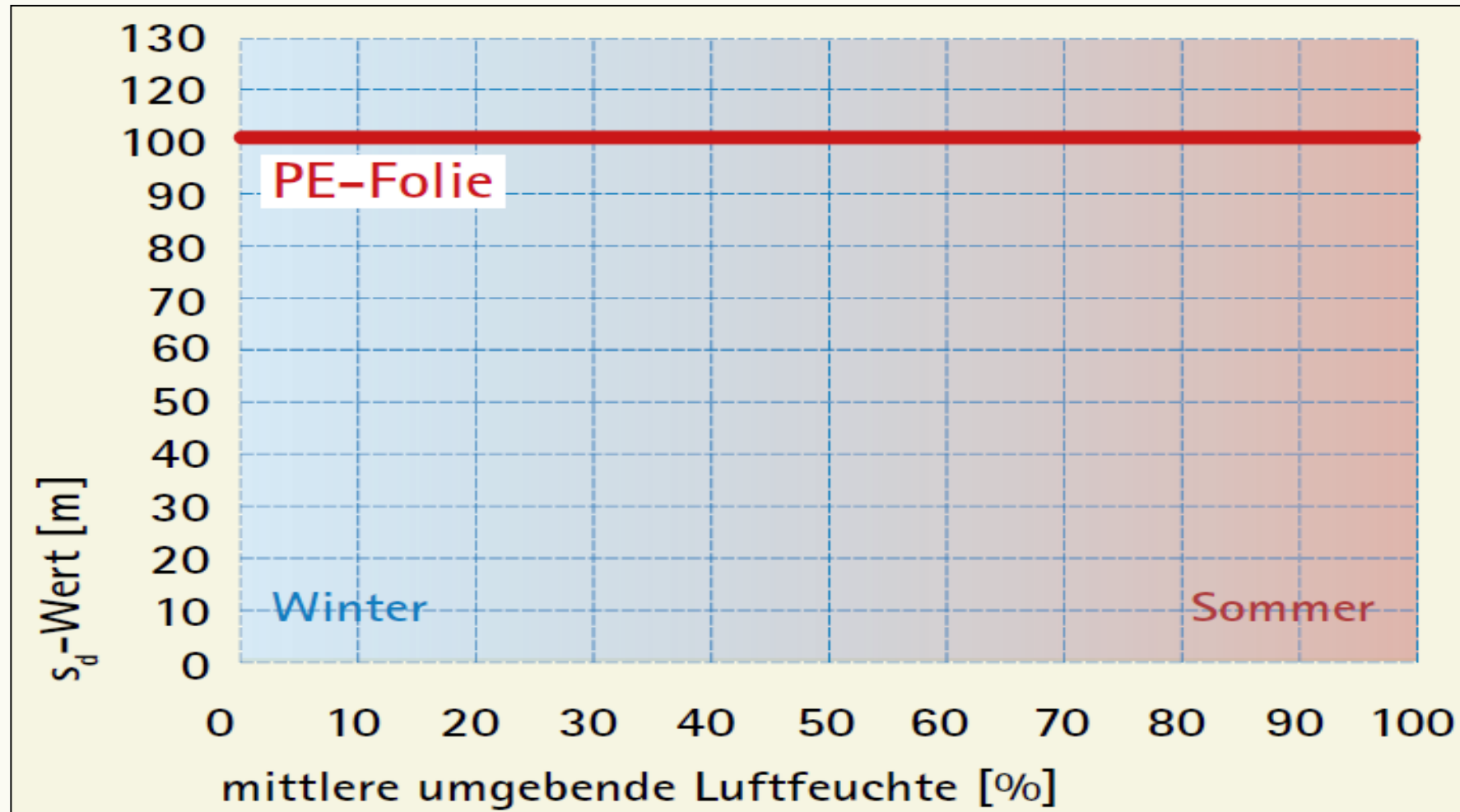


**Freedom from structural damage  
due to vapour membranes with  
humidity – variable  
diffusion resistance**

In winter: protection against moisture entry

In summer: high drying potential

# Sd-value of normal vapour retarders with constant sd-value



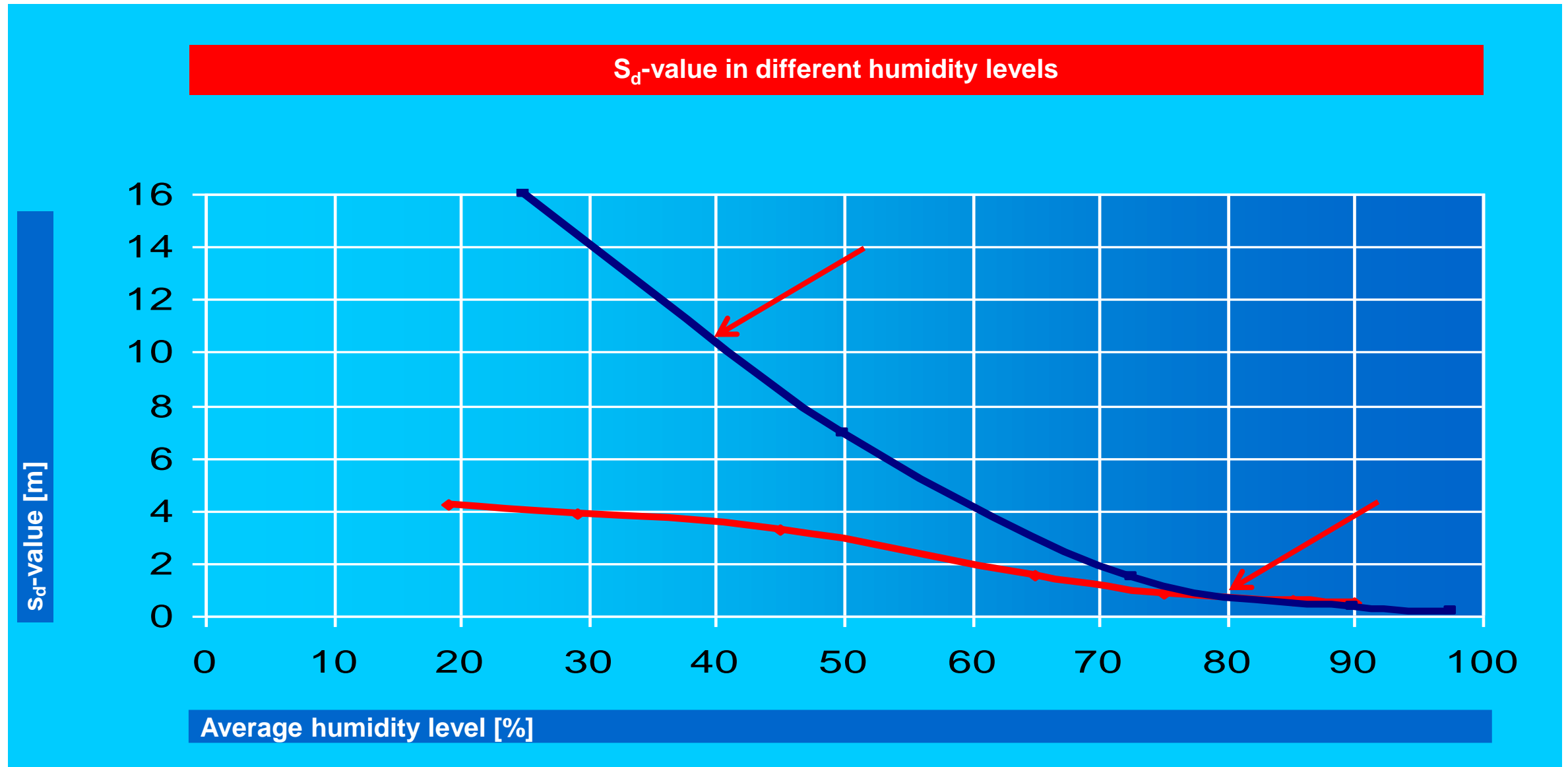


## Building damage due to build in moisture

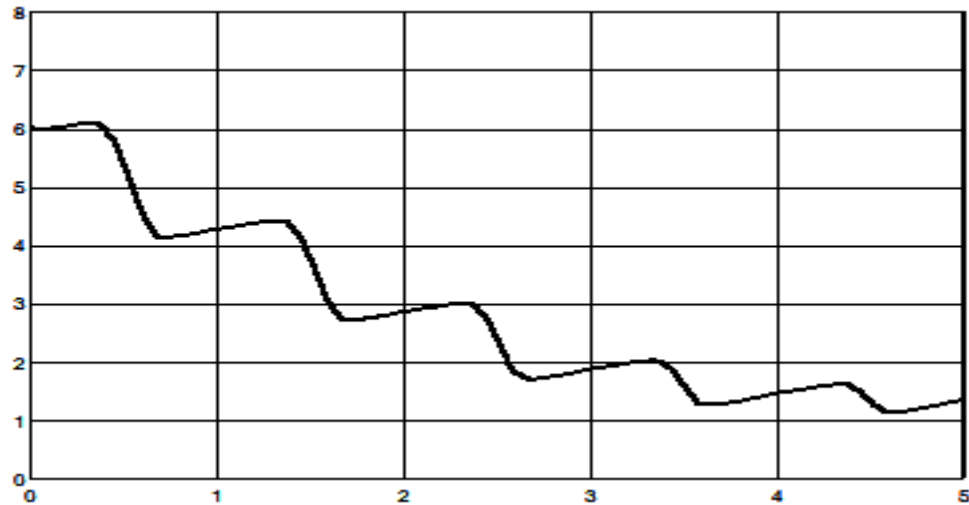


... und die Dämmung ist perfekt

# Intelligent vapour retarders



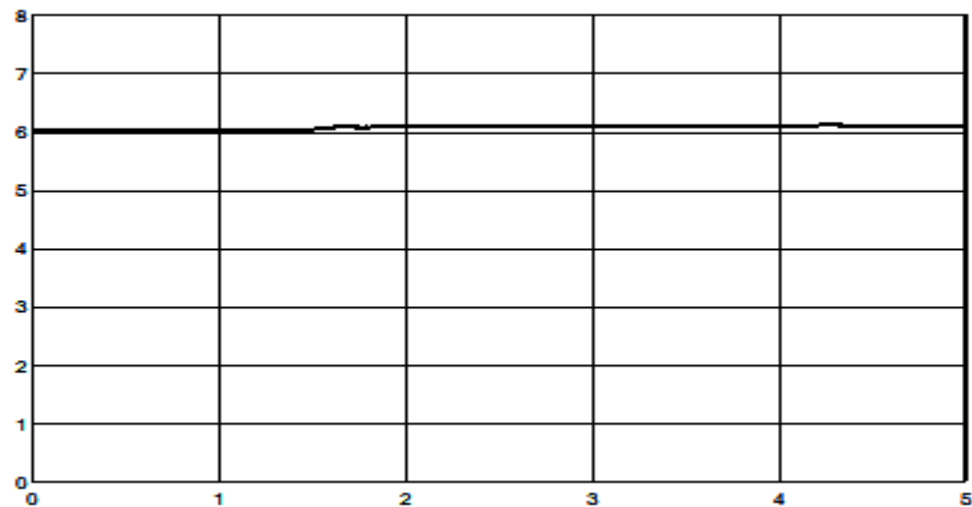
# Stockholm roof – calculation freedom from structural damage



pro clima INTELLO  
app. 1.100 g/(m<sup>2</sup>\*a)



High security against unforeseen moisture



PE sheet  
app. 20 g/(m<sup>2</sup>\*a)



No securities against unforeseen moisture



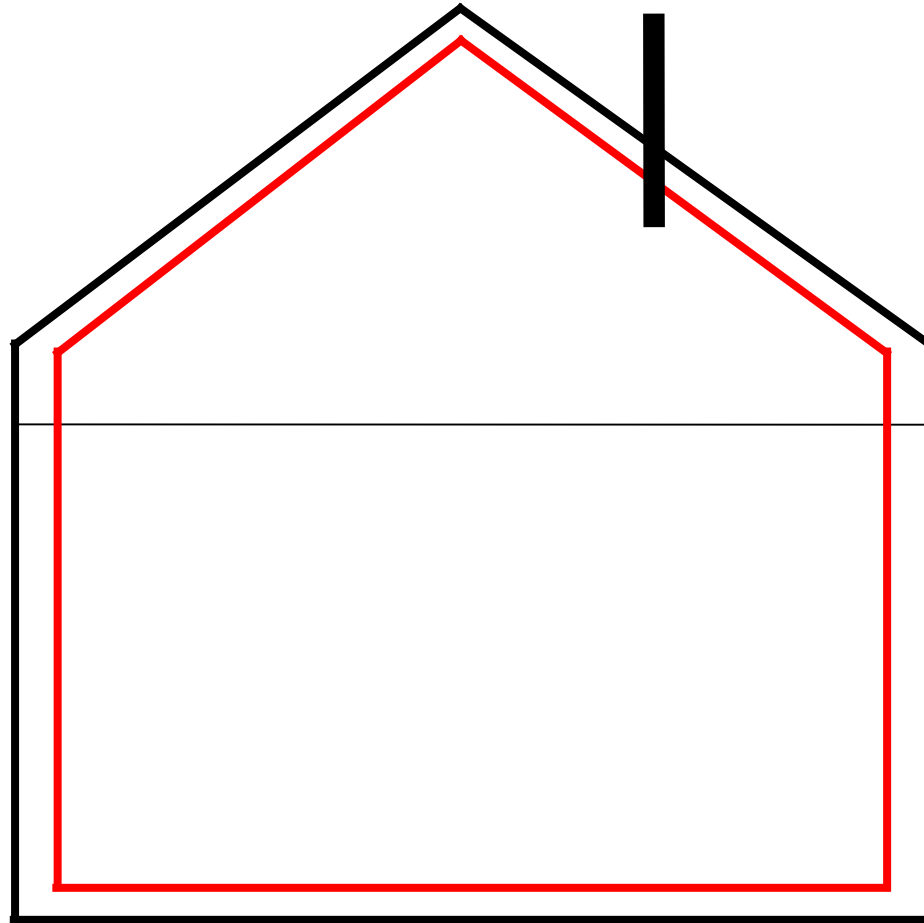
## pro clima INTELLO





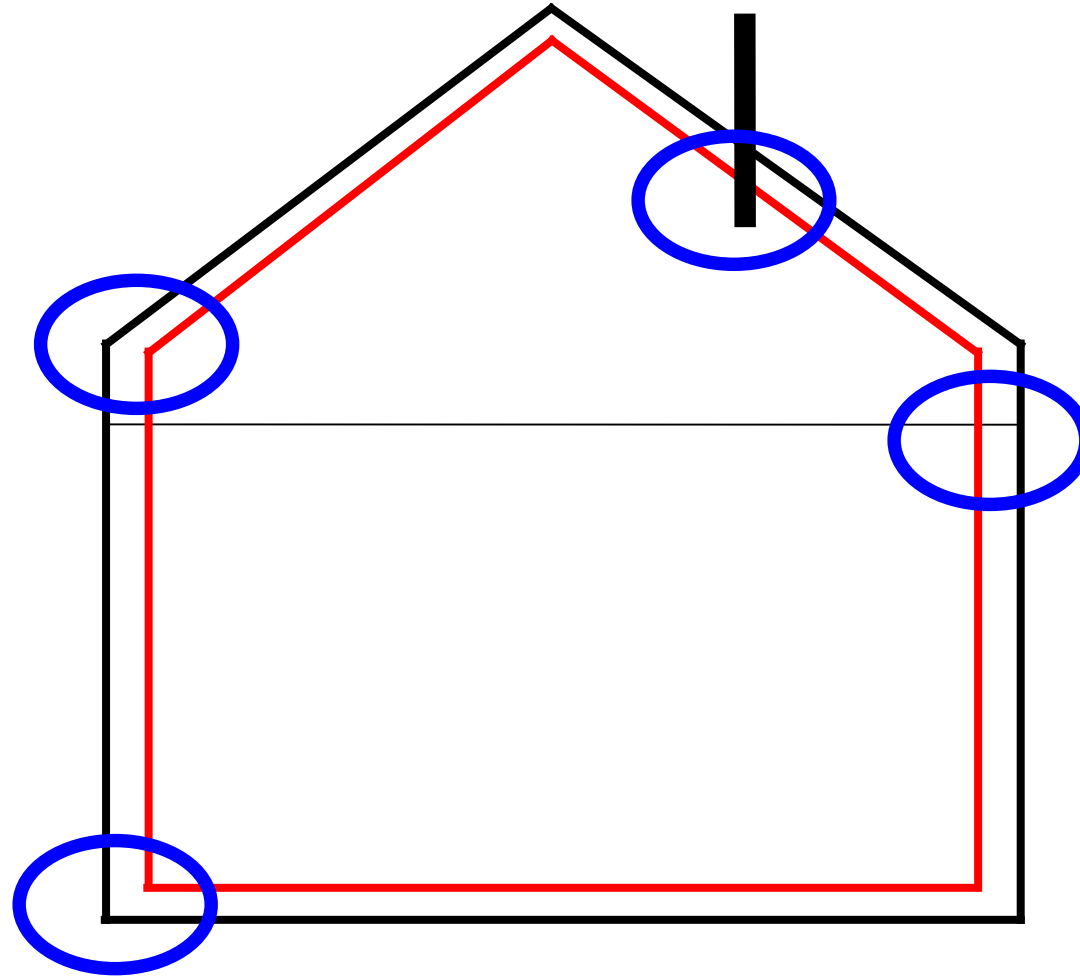
Schadstoffgeprüft nach  
**AgBB**  
nach dem Kriterien des Ausschusses  
für gesundheitliche Bewertung von  
Bauprodukten des Umweltbundesamt

## Planning of airtightness – the principal





## Planning of airtightness – the principal



# Membrane overlaps



... und die Dämmung ist perfekt

# High quality tapes – durability – artificial aging

U N I K A S S E L  
V E R S I T Ä T

Untersuchung der Dauerhaftigkeit von Klebeverbindung für den Bereich der Luftdichtheitsschicht der Gebäudehülle (nach dem internen Manuskript der DIN 4108-11 Stand August 2012) sowie weiterführende Messungen bis zu zwei Jahren beschleunigter Alterung.



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<http://www.bpy.uni-kassel.de>



## CONFIRMED BY TESTS

**Permanent airtightness with pro clima!  
Tested for the entire usage period**

**100 years**

- ✓ **Reliable functioning tested for 100 years**
- ✓ **Independently confirmed**
- ✓ **Minimum requirements significantly exceeded**

**Thermal insulation and airtightness should work for more than 50 years**

Adhesive tapes for the creation of airtightness in accordance with DIN 4108-7, SIA 180 or OENORM B 8110-2 should have a durability of 50 to 100 years – after all, this is the expected service life of the thermal insulation structures that they have to reliably protect against damage due to the convective entry of moisture. This period corresponds with reality as airtightness is currently being optimised and thermal insulation is being replaced or adapted for today's legal requirements on structures dating from the 1950s, 1960s and 1970s.

**As little as 17 years can be regarded as permanent**



A process for accelerated aging of adhesive tape joints has been developed at the University of Kassel as part of a research project on "Quality assurance for adhesive-based joint technology in airtightness layers". With this process, adhesive tapes have to demonstrate certain specified minimum tensile strengths after being stored at increased air temperature and humidity (65 °C and 80% relative humidity) for a period of 120 days (this corresponds to around 17 years in reality). An adhesive tape can then already be regarded as permanent.

**Tests have shown that pro clima adhesive tapes work for 100 years**

As part of tests on the permanence of airtight joints, pro clima's TESCON VANA, UNI TAPE and TESCON No.1 adhesive tapes have also been subjected to accelerated aging at the University of Kassel under the conditions described above. The test period was also increased from 120 days to 700 days here. Accelerated aging for 700 days corresponds to 100 years in reality. The test results for the three adhesive tapes from pro clima were also positive for this increased period of accelerated aging.

**You are on the safe side with pro clima!**

These demanding tests with increased test periods have confirmed the suitability of the TESCON VANA, UNI TAPE and TESCON No.1 adhesive tapes for the creation of permanent airtightness in accordance with the requirements of DIN 4108-7, SIA 180 and OENORM B 8110-2. This confirms that vapour check and airtightness membranes and airtight wood-based panels can be reliably stuck using pro clima products!



... und die Dämmung ist perfekt





# TESCON VANA

**CONFIRMED BY TESTS**

**100  
years**

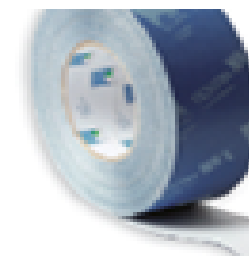
**Permanent airtightness with pro clima!  
Tested for the entire usage period**



**TESCON® VANA**



**UNI TAPE**



**TESCON® No 1**

Demanding tests with increased test periods have confirmed the suitability of TESCO VANA, UNI TAPE and TESCO No.1 adhesive tapes for the creation of permanent airtightness which surpass the requirements of DIN 4108-7, SIA 180 and OENORM B 8110-2.

This confirms that vapour check and airtightness membranes and airtight wood-based panels can be reliably bonded using pro clima products!

# TESCON PRIMER RP



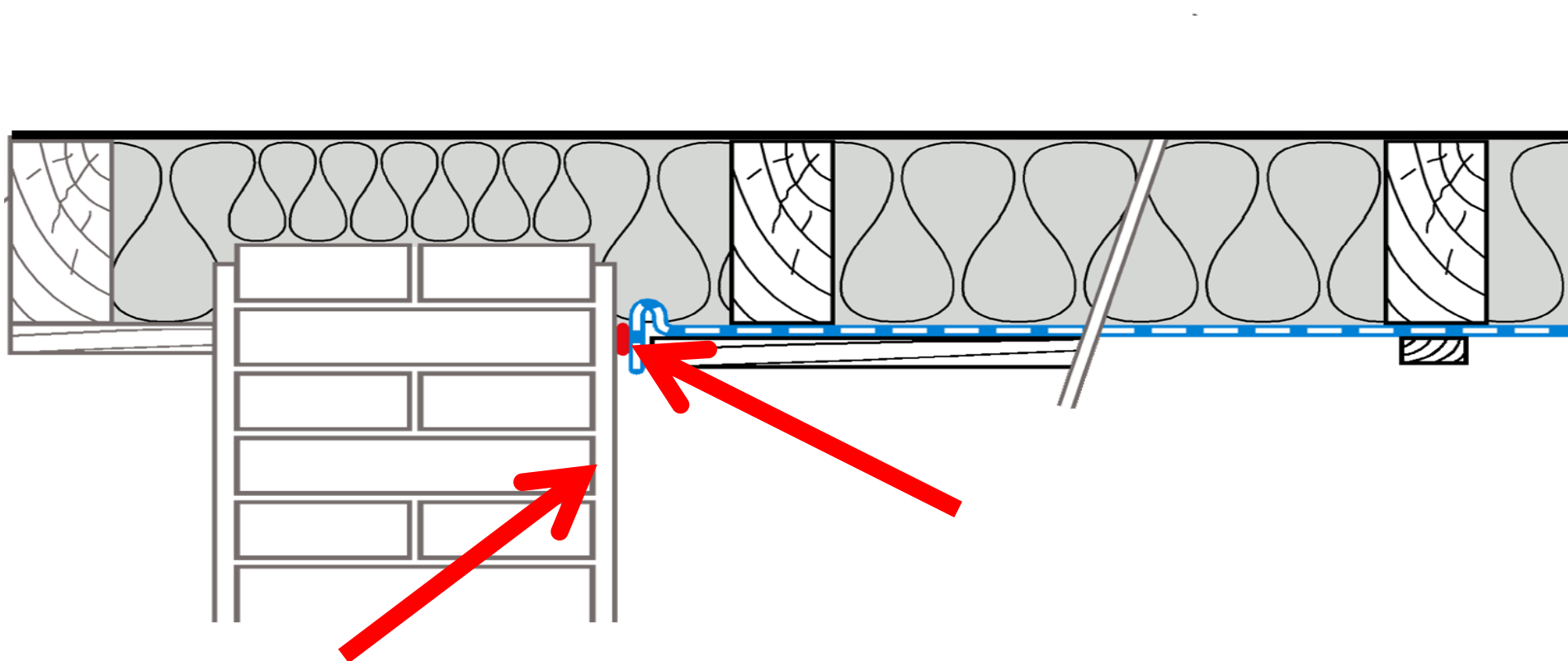


# pro clima SPRIMER



... und die Dämmung ist perfekt

## airtightness – connection membrane to rough surfaces





## airtightness – connection membrane to rough surfaces



## airtightness – connection membrane to rough surfaces



# airtightness – penetrations of cables and pipes



... und die Dämmung ist perfekt

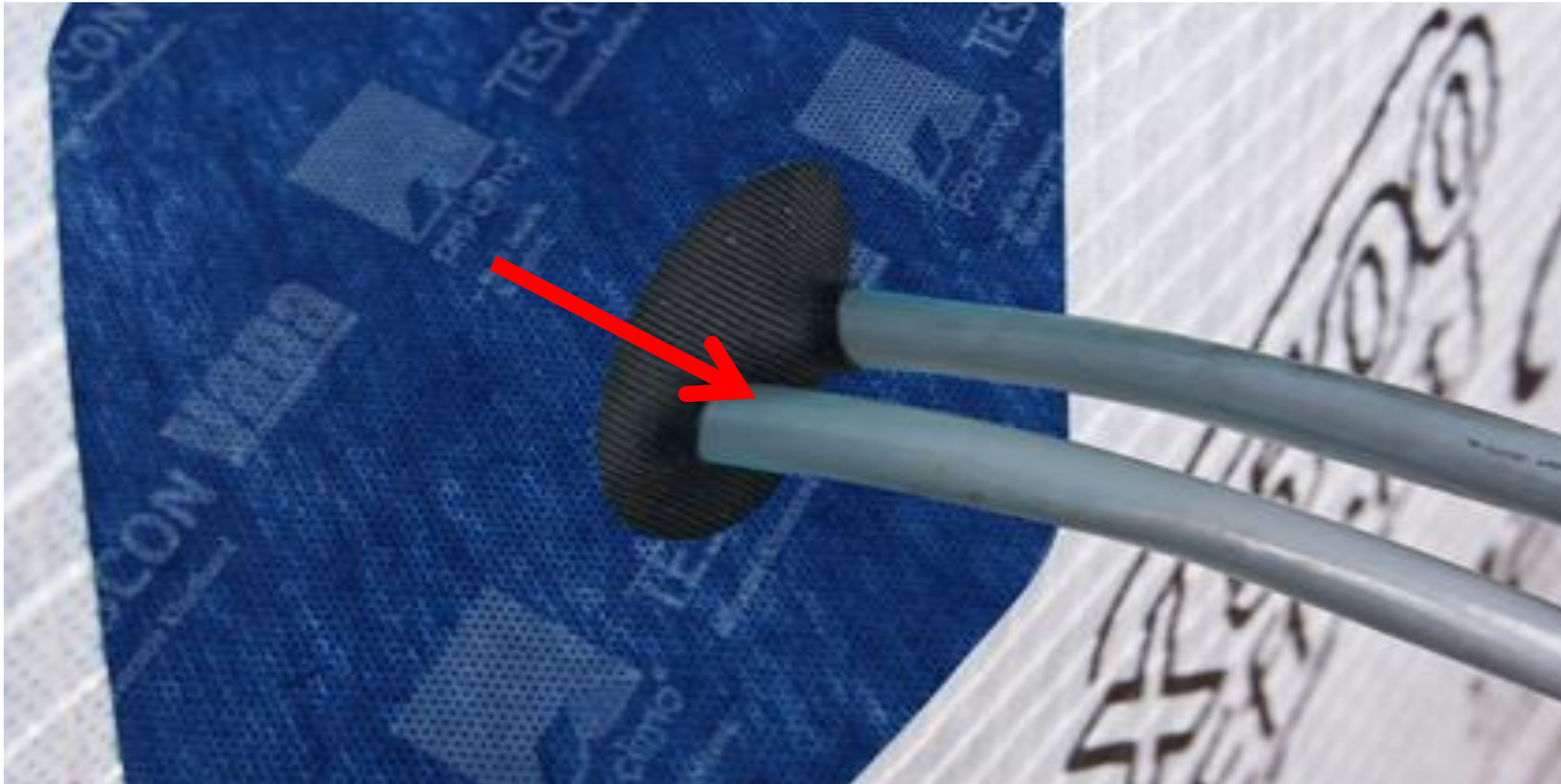


## ROFLEX - pipe grommets





## KAFLEX - cable grommets



## Ductwork – plugs – pro clima STOPPA



... und die Dämmung ist perfekt



# AEROSANA VISCONN – sprayable airtightness layer



... und die Dämmung ist perfekt

# AEROSANA VISCONN – sprayable airtightness layer

How to realise this connection airtight?



... und die Dämmung ist perfekt



# AEROSANA VISCONN – sprayable airtightness layer

How to realise this connection airtight?



... und die Dämmung ist perfekt

# AEROSANA VISCONN – sprayable airtightness layer

Connection CLT to concrete



... und die Dämmung ist perfekt



# AEROSANA VISCONN – sprayable airtightness layer

Connection CLT to concrete



... und die Dämmung ist perfekt





**...and the insulation  
is perfect**

